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An evaluation of error performance estimation scheme for DS1 transmission systems carrying live traffic

Eu, J.H.

Northern Telecom Inc., Research Triangle Park, NC, USA;

This paper appears in: Communications, IEEE Transactions on

Publication Date: March 1990

On page(s): 384 - 391

Volume: 38, Issue: 3

ISSN: 0090-6778

Reference Cited: 28

CODEN: IECMBT

Inspec Accession Number: 3653341

Abstract:

Under the memoryless binary symmetric channel assumption, the author evaluates performance estimation schemes for DS1 **transmission** systems carrying live Bipolar **violations**, framing bit errors, and **code**-detected errors. Common estimates of bit error ratios and the respective numbers of errored seconds and errored seconds that are fundamental parameters in characterizing the performance of DS1 **transmission** systems. A basic framework based on the coefficient of variation is proposed to evaluate several estimation schemes. Serious drawbacks of the existing estimation schemes based on the superframe (D4) format are identified. A new method for estimating the number of errored seconds is proposed. A computer simulation shows that this proposed method performs much better than the conventional counting method. The performance of the cyclic redundancy check (CRC) **code** of the extended superframe (ESF) format is also evaluated through the use of a computer simulation. Simulation results show that all the errored seconds are detected by the CRC **code**. It is a welcome feature of the **code** for real-time performance monitoring. Further results suggest a new threshold of 326 CRC errors per second for determining errored seconds.

Index Terms:

coding errors digital communication systems error statistics DS1 transmission systems violations bit error ratios code-detected errors coefficient of variation computer simulation cyclic redundancy check code error performance estimation schemes errored seconds errors live traffic memoryless binary symmetric channel superframe format



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Multiplexing and transmission systems for all-optical networks

Takasaki, Y.

Hitachi Ltd., Tokyo, Japan;

This paper appears in: **Communications, 1990. ICC 90, Including Superc Technical Sessions. SUPERCOMM/ICC '90. Conference Record., IEEE International Conference on**

Meeting Date: 04/16/1990 - 04/19/1990

Publication Date: 16-19 April 1990

Location: Atlanta, GA USA

On page(s): 1668 - 1672 vol.4

Reference Cited: 12

Inspec Accession Number: 3832446

Abstract:

These systems are investigated as an application of new line coding schemes paired block **codes** and multiblock **codes**, which use coding rule **violations** to **transmission** frame structures so that limited functions of optical logic can be for processing. Redundancies are utilized for clock recovery through logical processing. The upper bound efficiency of this type of **code** and the jitter due to imperfect clock recovery are analyzed. An application of this type of line **code** to the multiplexing system for all-optical networks is investigated. Future superbroadband cross-connect systems are used as examples to compare wavelength division multiplexing, time division multiplexing and photonic TDM which is especially promising in super-high-speed applications (e.g. above 10 Gb/s). The application of a paired block **code** with a frame format to such superbroadband multiplexing is studied. Multiplexing of STM 4 signals into an all-optical frame format with 20- to 30-Gb/s capacity is investigated to demonstrate the efficacy of this type of multiplexing scheme.

Index Terms:

broadband networks encoding frequency division multiplexing optical links optical time division multiplexing 20 to 30 Gbit/s all-optical networks clock recovery coding rule violations jitter line coding schemes multiblock codes optical logic paired block codes photo superbroadband cross-connect systems time division multiplexing transmission frame format upper bound efficiency wavelength division multiplexing

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Circuits of coder/decoder and error detection in 5B6 transmission code

Abou El-Azm, A.

Fac. of Electron. Eng., Menouf, Egypt ;

This paper appears in: Computers and Communications, 1997. Proceedin
Second IEEE Symposium on

Meeting Date: 07/01/1997 - 07/03/1997

Publication Date: 1-3 July 1997

Location: Alexandria Egypt

On page(s): 690 - 693

Reference Cited: 4

Number of Pages: xvii+709

Inspec Accession Number: 5773625

Abstract:

This paper presents circuits for transforming an electrical signal in the form of of binary digits into a form having lower disparity, wherein successive groups binary digits in the sequence are coded as groups of six binary digits. The cod arranged according to the specific **code** translation map. The paper also includ for decoding the groups of digits so produced according to the decoding transl A description of a **violation** detector and a **violation** rate measurement is als

Index Terms:

binary sequences block codes decoding error detection codes logic circuits 5B6B transmission code binary sequence code translation map coder/decoder circuits d decoding translation map error detection five binary digits logic circuits six binary dig violation detector violation rate measurement

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L5: Entry 1 of 1

File: USPT

Apr 24, 2001

DOCUMENT-IDENTIFIER: US 6222877 B1

TITLE: Method for performance monitoring of data transparent communication links

Brief Summary Text (11):

The primary performance metric for characterizing the occurrence of bit errors is the bit error rate (BER) of a link, defined as the relative frequency of bit errors over a given time interval for a given sequence of data bits. The maximum acceptable bit error rate (BER) of a digital data transmission link is usually a number much smaller than unity, such as 10^{-12} . The BER measurement is typically defined for a test bit pattern such as a pseudo-random bit sequence (PRBS) of a particular periodicity. A BER of 10^{-12} means that on average, 1 bit error occurs for every 1 trillion consecutive data bits. It is important to note that depending on the statistics of the failure mechanism, there could be many intervals of 1 trillion bits where no errors occur, while many other such intervals contain more than one bit error. Hence, along with the BER, other metrics such as Error Free Seconds (EFS) and Severely Errored Seconds (SES) are employed to characterize a link.

Brief Summary Text (13):

In transmission systems known as data transparent links, the data bits are not accessed with reference to a particular transmission protocol, which precludes the use of parity violation, CRC, or code violation techniques. In transmissions of this type, the sequence of bits does not contain any standard, repeated sequences that can be relied on to evaluate the accuracy of transmission. In such systems, a method known as pseudo error monitoring can be used. In one such method an incoming stream of data symbols is sampled using at least two different methods, and the results are compared. If they agree for a particular data bit, that bit is assumed accurately received; if they disagree, the reception is assumed to be an error. An error rate calculated according to this method is termed a pseudo error rate (PER).

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